12-14-90
Vol. 55 No. 241

Federal Register

Friday
December 14, 1990

Book 2

United States
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SECOND CLASS NEWSPAPER

Postage and Fees Paid
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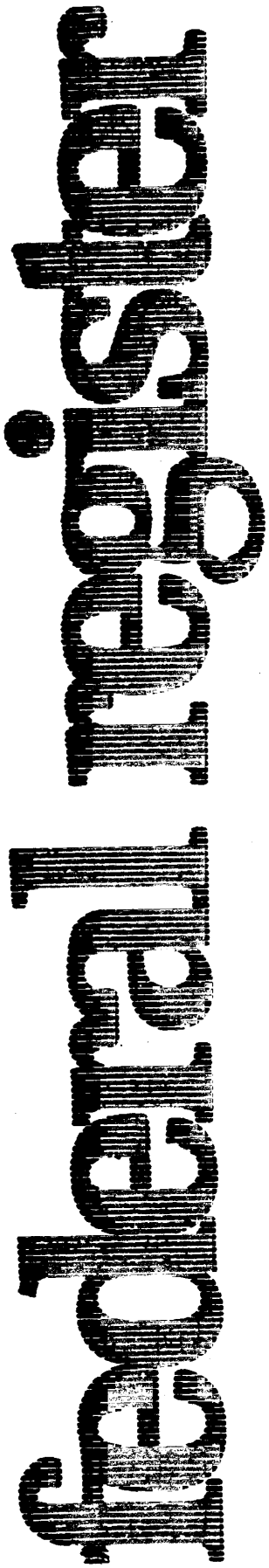
(ISSN 0097-6326)



Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 300

[FRL-3730-8]

RIN 2050 AB73

Hazard Ranking System

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is adopting revisions to the Hazard Ranking System (HRS), the principal mechanism for placing sites on the National Priorities List (NPL). The revisions change the way EPA evaluates potential threats to human health and the environment from hazardous waste sites and make the HRS more accurate in assessing relative potential risk. These revisions comply with other statutory requirements in the Superfund Amendments and Reauthorization Act of 1986 (SARA).

DATES: Effective date March 14, 1991. As discussed in Section III H of this preamble, comments are invited on the addition of specific benchmarks in the air and soil exposure pathways until January 14, 1991.

ADDRESSES: Documents related to this rulemaking are available at and comments on the specific benchmarks in the air and soil exposure pathways may be mailed to the CERCLA Docket Office, OS-245, U.S. Environmental Protection Agency, Waterside Mall, 401 M Street, SW, Washington, DC 20460, phone 202-382-3046. Please send four copies of comments. The docket is available for viewing by appointment only from 9:00 am to 4:00 pm, Monday through Friday, excluding Federal holidays. The docket number is 105NCP-HRS.

FOR FURTHER INFORMATION CONTACT: Steve Caldwell or Agnes Ortiz, Hazardous Site Evaluation Division, Office of Emergency and Remedial Response, OS-230, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, or the Superfund Hotline at 800-424-9346 (in the Washington, DC area, 202-382-3000).

SUPPLEMENTARY INFORMATION:

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I. Background

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. 9601 *et seq.*), commonly called the Superfund, in response to the dangers posed by uncontrolled releases of hazardous substances, contaminants, and pollutants. To implement section 105(8)(A) of CERCLA and Executive Order 12316 (46 FR 42237, August 20, 1981), the U.S. Environmental Protection Agency (EPA) revised the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR part 300, on July 16, 1982 (47 FR 31180), with later revisions on September 16, 1985 (50 FR 37624), November 20, 1985 (50 FR 47912), and March 8, 1990 (55 FR 8666). The NCP sets forth guidelines and procedures for responding to releases or potential release of hazardous substances, pollutants, or contaminants.

Section 105(8)(A) of CERCLA (now section 105(a)(8)(A)) requires EPA to establish:

> Criteria for determining priorities among releases or threatened releases [of hazardous substances] throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action. Criteria and priorities * * * shall be based upon the relative risk or danger to public health or welfare or the environment * * * taking into account to the extent possible the population at risk, the hazard potential of the hazardous substances at such facilities, the potential for contamination of drinking water supplies, the potential for direct human contact, [and] the potential for destruction of sensitive ecosystems * * *.

To meet this requirement and help set priorities, EPA adopted the Hazard Ranking System (HRS) as appendix A to the NCP (47 FR 31180, July 16, 1982). The HRS is a scoring system used to assess the relative threat associated with actual or potential releases of hazardous substances at sites. The HRS is the primary way of determining whether a site is to be included on the National Priorities List (NPL), the Agency's list of sites that are priorities for long-term evaluation and remedial response, and is a crucial part of the Agency's program to address the identification of actual and potential releases. (Each State can nominate one site to the NPL as a State top priority regardless of its HRS score; sites may also be added in response to a health advisory from the Agency for Toxic Substances and Disease Registry (see NCP, 40 CFR 300.425(c)(3)).) Under the original HRS, a score was determined for a site by evaluating three migration pathways—ground water, surface water, and air. Direct contact and fire and explosion threats were also evaluated to determine the need for emergency actions, but did not enter into the decision on whether to place a site on the NPL.

In 1986, Congress enacted the Superfund Amendments and Reauthorization Act of 1986 (SARA) (Pub. L. 99-499), which added section 105(c)(1) to CERCLA, requiring EPA to amend the HRS to assure "to the maximum extent feasible, that the hazard ranking system accurately assesses the relative degree of risk to human health and the environment posed by sites and facilities subject to review." Congress, in its Conference Report on SARA, stated the substantive standard against which HRS revisions could be assessed:

> This standard is to be applied within the context of the purpose for the National Priorities List; i.e., identifying for the States and the public those facilities and sites which appear to warrant remedial actions. * * * This standard does not, however, require the Hazard Ranking System to be equivalent to detailed risk assessments, quantitative or qualitative, such as might be performed as part of remedial actions. The standard requires the Hazard Ranking System to rank sites as accurately as the Agency believes is feasible using information from preliminary assessments and site inspections * * * Meeting this standard does not require long-term monitoring or an accurate determination of the full nature and extent of contamination at sites or the projected levels of exposure such as might be done during remedial investigations and feasibility studies. This provision is intended to ensure that the Hazard Ranking System performs with a degree of accuracy appropriate to its role in expeditiously identifying candidates for response actions. [H.R. Rep. No. 962, 99th Cong., 2nd Sess. at 199-200 [1986]]

Section 105(c)(2) further specifies that the HRS appropriately assess the human health risks associated with actual or potential contamination of surface waters used for recreation or drinking

water and that this assessment should take into account the potential migration of any hazardous substance through surface water to downstream sources of drinking water.

SARA added two criteria for evaluating sites under section 105(a)(8)(A): Actual or potential contamination of the ambient air and threats through the human food chain. In addition, CERCLA section 118, added by SARA, requires EPA to give a high priority to facilities where the release of hazardous substances has resulted in the closing of drinking water wells or has contaminated a principal drinking water supply. Finally, CERCLA section 125, added by SARA, requires revisions to the HRS to address facilities that contain substantial volumes of wastes specified in section 3001(b)(3)(A)(i) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act (RCRA). These wastes include fly ash wastes, bottom ash wastes, slag wastes, and flue gas emission control wastes generated primarily from the combustion of coal or other fossil fuels. Specifically, section 125 requires EPA to revise the HRS to assure the appropriate consideration of each of the following site-specific characteristics of such facilities:

- The quantity, toxicity, and concentrations of hazardous constituents that are present in such waste and a comparison with other wastes;
- The extent of, and potential for, release of such hazardous constituents into the environment; and
- The degree of risk to human health and the environment posed by such constituents.

EPA published an advance notice of proposed rulemaking (ANPRM) on April 9, 1987 (52 FR 11513), announcing its intention to revise the HRS and requesting comments on a number of issues. After a comprehensive review of the original HRS, including consideration of alternative models and Science Advisory Board review, EPA published a notice of proposed rulemaking (NPRM) for HRS revisions on December 23, 1988 (53 FR 51962). The NPRM contains a detailed preamble, which should be consulted for a more extensive discussion of CERCLA, SARA, the HRS, and the proposed changes to the HRS.

Today, EPA is publishing the revised HRS, which will supersede the HRS previously in effect as appendix A to the NCP. CERCLA section 105(c)(1) states that the revised HRS shall be applied to any site newly listed on the NPL after its effective date; as specified in section 105(c)(3), sites scored with the original HRS prior to that effective date need not be reevaluated.

The HRS is a scoring system based on factors grouped into three factor categories. The factor categories are multiplied and then normalized to 100 points to obtain a pathway score (e.g., the ground water migration pathway score). The final HRS score is obtained by combining the pathway scores using a root-mean-square method. The proposed HRS revised every factor to some extent. A few factors were replaced, and several new factors were added. The major proposed changes included:

(1) Consideration of potential as well as actual releases to air;

(2) Addition of mobility factors;

(3) Addition of dilution and distance weightings for the water migration pathways and modification of distance weighting in the air migration pathway;

(4) Revisions to the toxicity factor;

(5) Additions to the list of covered sensitive environments;

(6) Addition of human food chain and recreation threats to the surface water migration pathway;

(7) Revision of the hazardous waste quantity factor to allow a tiered approach;

(8) Addition of health-based benchmarks for evaluating population factors and ecological-based benchmarks for evaluating sensitive environments;

(9) Addition of factors for evaluating the maximally exposed individual; and

(10) Inclusion of a new onsite exposure pathway.

EPA conducted a field test of the proposed HRS to assess the feasibility of implementing the proposed HRS factors, to determine resources required for specific tasks, to assess the availability of information needed for evaluation of sites, and to identify difficulties with the use of the proposed revisions. To meet the objectives, site inspections were performed at 29 sites nationwide. The sites were selected either because work was already planned at the site or because the sites had specific features EPA wanted to test using the proposed revisions to the HRS. The major results of the field test were summarized on September 14, 1989 (54 FR 37949), when the field test report was made available for public review and comment.

II. Overview of the Final Rule

The rule being promulgated today incorporates substantial changes to revisions proposed in December 1988. EPA has changed the rule for three reasons: (1) To respond to the general comment submitted by many commenters that the factor categories and pathways need to be consistent with each other; (2) to respond to specific recommendations made by commenters; and (3) to respond to problems identified during the field test and discussed in the field test report. Major changes affecting multiple pathways include:

- Multiplication of hazardous waste quantity factor, toxicity, and other waste characteristics factors;
- Uncapping of population factors (i.e., no limit is placed on maximum value);
- Revised criteria for establishing an observed release;
- Capping of potential to release at a value less than observed release;
- Revision of the toxicity evaluation to select carcinogenic and non-cancer chronic values in preference to acute toxicity values;
- Elimination of Level III concentrations and extension of weighting based on levels of exposure to nearest individual (well/intake; formerly maximally exposed individual) factors;
- Modification of the weights assigned to Level I and Level II concentrations;
- Revisions to the benchmarks used and methods for determining exceedance of benchmarks;
- Use of ranges to assign values for potentially exposed populations;
- Inclusion of factors assessing exposures of the nearest individual in all pathways;
- Revisions to distance and dilution weights in all pathways except ground water migration;
- Replacement of the use factors with less heavily weighted resources factors;
- Evaluation of wetlands based on size or surface water frontage; and
- Specific instructions for the evaluation of radionuclides at radioactive waste sites and sites with radioactive and other hazardous substances wastes.

The major changes in the ground water migration pathway include:

- Replacement of depth to aquifer/hydraulic conductivity and sorptive capacity factors with travel time and depth to aquifer factors; and
- Revision of the mobility factor, including consideration of distribution coefficients.

In the surface water migration pathways, the major changes include:

- Elimination of the separate recreational use threat;
- Addition of a ground water to surface water component;

- Incorporation of bioaccumulation into the waste characteristics factor category rather than the targets factor category for the human food chain threat;
- Revision to allow use of additional tissue samples in establishing Level I concentrations for the human food chain threat; and
- Addition of ecosystem bioaccumulation potential factor for sensitive environments.

The major changes in the soil exposure pathway (formerly the onsite exposure pathway) include:

- Elimination of separate consideration of the high risk population;
- Inclusion of hazardous waste quantity in the waste characteristics factor category;
- Consideration of workers in the resident threat's targets factor category; and
- Revisions to scoring of terrestrial sensitive environments.

The major changes in the air migration pathway include:

- Separate evaluation of gas and particulate potential to release; and
- Consideration of actual contamination in evaluating sensitive environments.

Figures 1 to 4 show the differences between the pathways in the original HRS and in the final rule.

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Figure 1

Ground Water Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Persistence		Ground Water Use
or		Hazardous Waste Quantity		Distance to Nearest Well/
Route Characteristics				Population Served
Depth to Aquifer of Concern				
Net Precipitation				
Permeability of Unsaturated Zone				
Physical State				
Containment				

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Toxicity/Mobility		Nearest Well
or		Hazardous Waste Quantity		Population
Potential to Release				Resources
Containment				Wellhead Protection Area
Net Precipitation				
Depth to Aquifer				
Travel Time				

Figure 2

Surface Water Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	**Waste Characteristics**	X	**Targets**
Observed Release		Toxicity/Persistence		Surface Water Use
or		Hazardous Waste Quantity		Distance to Sensitive Environment
Route Characteristics				Population Served/Distance to Nearest Intake Downstream
Facility Slope/Intervening Terrain				
1-Year, 24-Hour Rainfall				
Distance to Nearest Surface Water				
Physical State				
Containment				

Figure 2

Surface Water Migration Pathway (continued)

FINAL HRS

Likelihood of Release:
Overland Flow/Flood Component

Observed Release
or
Potential to Release

By Overland Flow
- Containment
- Runoff
- Distance to Surface Water

By Flood
- Containment
- Flood Frequency

or

Likelihood of Release:
Ground Water to Surface Water Component

Observed Release
or
Potential to Release
- Containment
- Net Precipitation
- Depth to Aquifer
- Travel Time

X

Drinking Water Threat

Waste Characteristics	x	**Targets**
Toxicity/Mobility[1]/Persistence		Nearest Intake
Hazardous Waste Quantity		Population
		Resources

+

Human Food Chain Threat

Waste Characteristics	x	**Targets**
Toxicity/Mobility[1]/		Food Chain Individual
Persistence/Bioaccumulation		Population
Hazardous Waste Quantity		

+

Environmental Threat

Waste Characteristics	x	**Targets**
Ecosystem Toxicity/Mobility[1]/		Sensitive Environments
Persistence/Bioaccumulation		
Hazardous Waste Quantity		

[1] Mobility is only applicable to the Ground Water to Surface Water Component.

Figure 3

Soil Exposure Pathway [1]

FINAL HRS

Resident Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Observed Contamination		Toxicity Hazardous Waste Quantity		Resident Individual Resident Population Workers Resources Terrestrial Sensitive Environments

+

Nearby Population Threat

Likelihood of Exposure	X	Waste Characteristics	X	Targets
Attractiveness/Accessibility Area of Contamination		Toxicity Hazardous Waste Quantity		Population Within 1 Mile Nearby Individual

[1] New pathway.

Figure 4

Air Migration Pathway

ORIGINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release		Reactivity and Incompatibility Toxicity Hazardous Waste Quantity		Population Within 4-Mile Radius Distance to Sensitive Environment Land Use

FINAL HRS

Likelihood of Release	X	Waste Characteristics	X	Targets
Observed Release or Potential to Release Gas Gas Containment Gas Source Type Gas Migration Potential Particulate Particulate Containment Particulate Source Type Particulate Migration Potential		Toxicity/Mobility Hazardous Waste Quantity		Nearest Individual Population Resources Sensitive Environments

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